It was found that the volume of Ar^{36} in the tank dropped exponentially with the volume of helium circulated through the argon recovery system. A 95 percent recovery of the Ar^{36} introduced could be achieved by circulating 0.42 million liters of helium through the argon extraction system, and this can be accomplished in a period of 22 hours.

A second method of testing the efficiency for recovering argon from the tank was made using radioactive Ar^{37}. A Ra-Be neutron source was placed in a re-entrant iron pipe that extends to the center of the tank, see Figure 1. Fast neutrons with energy above 1.08 MeV produce Ar^{37} in the liquid by the two nuclear reactions, $Cl^{35}(n,p)S^{35}$ and $Cl^{37}(p,n)Ar^{37}$. The Ar^{37} produced by the neutron irradiation was removed along with carrier Ar^{36} (introduced after the irradiation) by three successive helium purges. The recoveries of Ar^{36} and Ar^{37} are given in Table II. It may be observed that the recovery of Ar^{37} with successive helium purges does follow the recovery of Ar^{36} carrier. These tests are of crucial importance, and do demonstrate that Ar^{37} produced in the tank by neutrino capture would be removed with an efficiency of at least 95 percent by the helium purge.

Argon-37 Counting

The entire argon sample is purified by gas phase chromatography and placed in a small low level proportional counter. A rare gas separation is required to remove Kr and Xe that are present in the rare gases recovered from the tank. These higher rare gases were absorbed in the tetrachloroethylene from the atmosphere during manufacture and storage. The rare gases recovered from the tank, therefore, contains 10.8 year Kr^{85}, and this activity must be completely removed from the final argon sample that is counted. To ensure the complete removal of the higher rare gases a gas phase chromatographic separation is carried out through a charcoal column.